

## WELDING TECHNOLOGY TASK LISTING

### STUDENT PERFORMANCE STANDARDS

EFFECTIVE DATE: April 1997

This Task List was developed from the AWS Standards using Level I AWS EG2.0-95 and Level II AWS EG3.0-96. Level III may be an optional component of some Postsecondary programs in Idaho. However, none of those tasks are listed in this publication. Instructors must hold AWS Certification as either AWS Welding Educator or AWS Welding Inspector. High School programs will cover Units A-F which is the content needed to complete Level I AWS Entry Level Welder certification. Postsecondary will cover Units A-K. The **Bold** numbers by the units in the first column are suggested common course numbers for Postsecondary programs.

### A. BASIC WELDING OCCUPATIONAL SKILLS

#### 01.0 EMPLOYABILITY SKILLS

**112**

- 01.01 Identify employment opportunities
- 01.02 Apply employment-seeking skills.
- 01.03 Interpret employment capabilities.
- 01.04 Demonstrate appropriate work behavior.
- 01.05 Maintain safe and healthy environment.
- 01.06 Maintain a business-like image.
- 01.07 Maintain working relationship with others.
- 01.08 Communicate on the job.
- 01.09 Adapt to change.
- 01.10 Demonstrate a knowledge of business.
- 01.11 Perform mathematical skills.

#### 02.0 DEMONSTRATE GENERAL SAFETY SKILLS

**111**

- 02.01 Identify the use and purpose of the safety equipment required for any assigned procedure or operation, i.e., ear plugs.
- 02.02 Set up and maintain a safe working environment for all assigned procedures or operations.
- 02.03 Demonstrate safe operation of a disc grinder.
- 02.04 Demonstrate safe operation of a bench grinder.
- 02.05 Demonstrate safe operation of a cut off saw.
- 02.06 Demonstrate safe operation of a band saw.
- 02.07 Demonstrate safe operation of a hydraulic shear, punch, brake, and roll.
- 02.08 Demonstrate safe operation of a drill press.
- 02.09 Demonstrate safe operation of common hand tools.

03.0 APPLY BASIC TRADE SKILLS

- 113* 03.01 Identify metals by appearance, weight, and magnetic properties.  
03.02 Identify metals by spark test.  
03.03 Use technical manuals and references.  
03.04 Demonstrate use of layout tools.  
03.05 Maintain a clean, well-organized work area.  
03.06 Identify basic weld symbols.  
03.07 Identify major welding procedures/processes.

04.0 OCCUPATIONAL ORIENTATION

- 112* 04.01 Follow safe practices.  
04.02 Prepare time or job cards, reports or records.  
04.03 Perform housekeeping duties  
04.04 Follow verbal instructions to complete work assignments.  
04.05 Follow written details to complete work assignments.

**B. DRAWING AND WELDING SYMBOL INTERPRETATION**

05.0 WELDING SYMBOLS

- 114* 05.01 Interpret basic elements of a drawing or sketch.  
05.02 Interpret welding symbol information.  
05.03 Fabricate parts from a drawing or sketch.

**C. ARC WELDING PRINCIPLES AND PRACTICES**

06.0 SHIELDED METAL ARC WELDING (SMAW)

- 165* 06.01 Perform safety inspections of equipment and accessories.  
06.02 Make minor external repairs to equipment and accessories.  
06.03 Set up for shielded metal arc welding operations on plain carbon steel.  
06.04 Operate shielded metal arc welding equipment.  
06.05 Make fillet welds, all positions, on plain carbon steel.  
06.06 Make groove welds, all positions, on plain carbon steel.  
06.07 Perform 2G - 3G - 4G limited thickness qualification tests on plain carbon steel plate.

- 07.0 GAS METAL ARC WELDING (GMAW, GMAW-S)  
07.01 Perform safety inspections of equipment and accessories.  
07.02 Make minor external repairs to equipment and accessories.  
175 07.03 Set up for gas metal arc welding operations on plain carbon steel.  
07.04 Operate gas metal arc welding equipment.  
Short circuit transfer  
07.05 Make fillet welds, all positions, on plain carbon steel.  
07.06 Make groove welds, all positions, on plain carbon steel.  
Spray transfer (optional)  
07.07 Make 1F - 2F welds on plain carbon steel.  
07.08 Make 1G welds on plain carbon steel.
- 08.0 FLUX CORED ARC WELDING (FCAW, FCAW-G)  
08.01 Perform safety inspections of equipment and accessories.  
08.02 Make minor external repairs to equipment and accessories.  
170 08.03 Set up for flux cored arc welding operations on plain carbon steel.  
08.04 Operate flux cored arc welding equipment.  
08.05 Make fillet welds, all positions, on plain carbon steel.  
08.06 Make groove welds, all positions, on plain carbon steel.
- 09.0 GAS TUNGSTEN ARC WELDING (GTAW)  
09.01 Perform safety inspections of equipment and accessories.  
09.02 Make minor external repairs to equipment and accessories.  
09.03 Set up for gas tungsten arc welding operations on plain carbon steel, aluminum,  
and stainless steel.  
190 09.04 Operate gas tungsten arc welding equipment.  
09.05 Make fillet welds on plain carbon steel.  
09.06 Make groove welds on plain carbon steel.  
09.07 Make 1F - 2F welds on aluminum.  
09.08 Make 1G welds on aluminum.  
09.09 Make 1F - 3F welds on stainless steel.  
09.10 Make 1G - 2G welds on stainless steel.

#### **D. OXYFUEL GAS PRINCIPLES AND PRACTICES**

- 10.0 MANUAL OXYFUEL GAS CUTTING (OFC)/WELDING(OFW)  
10.01 Perform safety inspections of equipment and accessories.  
10.02 Make minor external repairs to equipment and accessories.  
160 10.03 Set up for manual oxyfuel gas cutting operations on plain carbon steel.  
10.04 Operate manual oxyfuel cutting equipment.  
\*10.05 Make fillet welds on plain carbon steel.  
\*10.06 Make groove welds on plain carbon steel.  
\*10.07 Braze mild steel.

11.0 MACHINE OXYFUEL GAS CUTTING (OFC) - [TRACK BURNER]

- 160* 11.01 Perform safety inspections of equipment and accessories.  
11.02 Make minor external repairs to equipment and accessories.  
11.03 Set up machine oxyfuel gas cutting (track burner) operations on plain carbon steel.  
11.04 Operate machine oxyfuel gas cutting (track burner) equipment.  
11.05 Perform straight cutting operations on plain carbon steel.  
11.06 Perform bevel cutting operations on plain carbon steel.

E. **ARC CUTTING PRINCIPLES AND PRACTICES**

12.0 AIR CARBON ARC CUTTING (CAC-A)

- 195* 12.01 Perform safety inspections of equipment and accessories.  
12.02 Make minor external repairs to equipment and accessories.  
12.03 Set up manual air carbon arc gouging and cutting operations on plain carbon steel.  
12.04 Operate manual air carbon arc cutting equipment.  
12.05 Perform metal removal operations on plain carbon steel.

13.0 PLASMA ARC CUTTING (PAC)

- 195* 13.01 Perform safety inspections of equipment and accessories.  
13.02 Make minor external repairs to equipment and accessories.  
13.03 Set up for manual plasma arc cutting operations on plain carbon steel, aluminum, and stainless steel.  
13.04 Operate manual plasma arc cutting equipment.  
13.05 Perform shape cutting operations on plain carbon steel, aluminum, and stainless steel.

F. **WELDING INSPECTION AND TESTING PRINCIPLES**

14.0 VISUAL EXAMINATION PRINCIPLES AND PRACTICES

- 130* 14.01 Examine cut surfaces and edges of prepared base metal parts.  
14.02 Examine tack, intermediate layers, and completed welds.

**High School Requirement completed at this level which covers Level I Entry Level Welder.**

**Postsecondary will complete the remaining units and optional Level III which is not listed here.**

**G. LAYOUT AND FIT UP**

**15.0 LAYOUT TOOLS FOR GEOMETRIC CONSTRUCTION**

- 240** 15.01 Follow safe handling procedures.  
15.02 Select layout tools.  
15.03 Layout parts using advanced measurement practices.

**16.0 LAYOUT PRINCIPLES AND PRACTICES**

- 240** 16.01 Interpret drawing, sketch or specification information.  
16.02 Prepare work area for layout.  
16.03 Prepare material lists.  
16.04 Select material.  
16.05 Layout material.

**17.0 PART PREPARATIONS - CUTTING AND FORMING**

- 240** 17.01 Perform bending or forming operations.  
17.02 Perform drilling or boring operations.  
17.03 Perform shearing operations.  
17.04 Perform oxyfuel gas cutting, beveling and piercing operations.  
17.05 Perform arc cutting, beveling and piercing operations.  
17.06 Fitup parts or assemblies.

**H. DOCUMENTS GOVERNING WELDING AND WELDING INSPECTION**

**18.0 WELDING CODES AND OTHER STANDARDS**

- 130** 18.01 Locate essential welding information from a code or other standard.  
18.02 Interpret essential welding information from a code or other standard.

**19.0 QUALIFICATION AND CERTIFICATION**

- 130** 19.01 Locate essential information for welding procedure and performance qualification.  
19.02 Interpret essential information for welding procedure and performance qualification.

## **I. INTRODUCTION TO WELDING METALLURGY**

### **20.0 WELDING METALLURGY**

- 100/200**
- 20.01 Recognize fundamental principles related to welding metallurgy.
  - 20.02 Recognize fundamental principles related to the properties of metals.
  - 20.03 Recognize fundamental principles related to residual stress and distortion.

## **J. WELDING INSPECTION AND TESTING PRINCIPLES**

### **21.0 WELDING INSPECTION AND TESTING**

- 130**
- 21.01 Recognize the role of welding inspection and testing in industry.
  - 21.02 Examine cut surfaces and edges of prepared base metal parts.
  - 21.03 Examine tack, intermediate layers, and completed welds.

## **K. ADVANCED ARC WELDING PRINCIPLES AND PRACTICES**

### **22.0 SHIELDED METAL ARC WELDING (SMAW)**

- 180**
- 22.01 Perform safety inspections of equipment and accessories.
  - 22.02 Make minor external repairs to equipment and accessories.
  - 22.03 Set up for shielded metal arc welding operations.
  - 22.04 Operate shielded metal arc welding equipment.
  - 22.05 Execute corrective actions to repair surface flaws on welds and base metals.
  - 22.06 Make fillet welds, all positions, on carbon steel or stainless steel plate using stainless steel electrodes.
  - 22.07 Make groove welds, all positions, on carbon steel or stainless steel plate using stainless steel electrodes.
  - 22.08 Perform an all position workmanship qualification test on carbon steel or stainless steel plate using stainless steel electrodes.
- PIPE**
- 280**
- 22.09 Make fillet welds, all positions, on carbon steel pipe.
  - 22.10 Make 2G, 5G and 6G groove welds on carbon steel pipe.
  - 22.11 Perform a 6G unlimited thickness qualification test on carbon steel pipe.

- 23.0 ADVANCED GAS METAL ARC WELDING (GMAW, GMAW-S)
- 23.01 Perform safety inspections of equipment and accessories.
- 23.02 Make minor external repairs to equipment and accessories.
- 23.03 Set up for gas metal arc welding operations on carbon steel.
- 23.04 Operate gas metal arc welding equipment.
- 175 23.05 Execute corrective actions to repair surface flaws on welds and base metals.
- Spray transfer
- 23.06 Make fillet welds, all positions, on aluminum plate.
- 23.07 Make groove welds, all positions, on aluminum plate.
- 23.08 Perform an all positions workmanship qualification test on aluminum plate.
- 23.09 Make fillet welds in the 2F position on carbon steel pipe using spray transfer.
- Short circuit transfer
- 23.10 Make fillet welds, all positions, on carbon steel pipe, using short circuiting transfer.
- 23.11 Make 2G and 5G groove welds, on carbon steel pipe, using short circuiting transfer.
- Short circuit transfer and Spray transfer
- 23.12 Perform a combination workmanship qualification test on carbon steel pipe and plate.
- 24.0 ADVANCED FLUX CORED ARC WELDING (FCAW-S, FCAW-G)
- 24.01 Perform safety inspections of equipment and accessories.
- 24.02 Make minor external repairs to equipment and accessories.
- 24.03 Set up for flux cored arc welding operations on carbon steel.
- 24.04 Operate flux cored arc welding equipment.
- 24.05 Execute corrective actions to repair surface flaws on welds and base metals.
- Self-Shielded (Tubular)
- 170 24.06 Make fillet welds, all positions, on carbon steel pipe, using self-shielded electrodes.
- 24.07 Make 2G and 5G groove welds on carbon steel pipe using self-shielded electrodes.
- 24.08 Perform a combination workmanship qualification test on carbon steel pipe and plate.
- Gas-Shielded (Tubular)
- 24.09 Make fillet welds, all positions, on carbon steel pipe, using gas-shielded electrodes.
- 24.10 Make 2G and 5G groove welds on carbon steel pipe using gas-shielded electrodes.
- 24.11 Perform a combination workmanship qualification test on carbon steel pipe and plate.

25.0 **ADVANCED GAS TUNGSTEN ARC WELDING (GTAW) (Secondary Optional)**

- 25.01 Perform safety inspections of equipment and accessories.
- 25.02 Make minor external repairs to equipment and accessories.
- 25.03 Set up for gas tungsten arc welding operations on carbon steel, aluminum, and stainless steel.
- 290** 25.04 Operate gas tungsten arc welding equipment.
- 25.05 Execute corrective actions to repair surface flaws on welds and base metals.
- 25.06 Make 3F and 4F groove welds on aluminum sheet.
- 25.07 Make 2G - 4G groove welds on aluminum sheet.
- 25.08 Make 4F fillet welds on stainless steel sheet.
- 25.09 Make 3G - 4G groove welds on stainless steel sheet.
- 25.10 Make fillet welds, all positions, on carbon steel round tubing.
- 25.11 Make fillet welds, all positions, on aluminum round tubing.
- 25.12 Make fillet welds, all positions, on stainless round tubing.
- 25.13 Make 2G and 5G groove welds on carbon steel round tubing.
- 25.14 Make 2G and 5G groove welds on aluminum round tubing.
- 25.15 Make 2G and 5G groove welds on stainless steel round tubing.
- 25.16 Perform combination workmanship qualification tests on carbon steel round tubing and sheet.
- 25.17 Perform combination workmanship qualification test on aluminum round tubing and sheet.
- 25.18 Perform combination workmanship qualification tests on stainless steel round tubing and sheet.

**Complete Level I & II only. Level III is optional for P/S**